

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended): A color registration control system for a printing press having thereon a moving paper substrate, said system comprising:

an area scanner for acquiring an image of [the] a paper substrate on a printing press; and

an image processing system adapted to receive the image and process the image to determine any color register error of the printing press, wherein said image processing system includes the use of a hardware based binary correlator adapted to locate register marks on the paper substrate.

Claim 2 (original): The color registration control system as set forth in claim 1 wherein said binary correlator is implemented on an FPGA.

Claim 3 (original): The color registration control system as set forth in claim 1 wherein the area scanner is a CCD scanner.

Claim 4 (currently amended): The color registration control system as set forth in claim 1 and further including a light source generating illumination levels for said scanner and wherein said image processing system further includes the use of a hardware based histogrammer to process said illumination levels.

Claim 5 (original): The color registration control system as set forth in claim 4 wherein said histogrammer calculates a gray scale histogram of said illumination levels.

Claim 6 (original): The color registration control system as set forth in claim 4 wherein said histogrammer is implemented on an FPGA.

Claim 7 (currently amended): A color registration control system for a printing press having thereon a moving paper substrate, said system comprising:
a camera for acquiring an image of [the] a paper substrate on the printing press;
a light source adjacent [said scanner] the camera; and
an image processing system adapted to receive the image and process the image,
wherein said image processing system includes the use of a hardware based histogrammer to analyze the illumination levels produced by said light source by producing a gray scale histogram of the illumination levels.

Claim 8 (original): The color registration control system as set forth in claim 7 wherein said light source includes a strobe type light.

Claim 9 (original): The color registration control system as set forth in claim 7 wherein said camera is a CCD camera.

Claim 10 (original): The color registration control system as set forth in claim 7 wherein said histogrammer is implemented on a FPGA.

Claim 11 (currently amended): The color registration control system as set forth in claim 7 wherein said image processing system further includes a hardware based binary correlator adapted to process the acquired image.

Claim 12 (original): The color registration control system as set forth in claim 11 wherein said correlator is implemented on a FPGA.

Claim 13 (original): The color registration control system as set forth in claim 11 wherein said histogrammer and said binary correlator are implemented on one FPGA.

Claim 14 (currently amended): A color registration control system for a printing press having thereon a moving paper substrate, said system comprising:

an area scanner for acquiring an image of [the] a paper substrate on a printing press; and

an image processing system adapted to receive the image and process the image to determine any color register error, wherein said image processing system includes a hardware-based correlator adapted to locate register marks on the paper substrate and implemented on at least one FPGA.

Claim 15 (original): The color registration control system as set forth in claim 14 wherein said system include a binary correlator.

Claim 16 (original): The color registration control system as set forth in claim 14 and further including a light source for generating illumination levels, and wherein said components include a histogrammer adapted to produce a gray scale histogram of said illumination levels.

Claim 17 (original): The color registration control system as set forth in claim 16 wherein said components include a binary correlator implemented on the same FPGA on which said histogrammer is implemented.

Claim 18 (original): The color registration control system as set forth in claim 14 wherein said at least one FPGA includes two FPGAs.

Claim 19 (original): The color registration control system as set forth in claim 18 wherein one FPGA includes a binary correlator for image processing and the other FPGA includes control and interface functions.

Claim 20 (original): A color registration control system for a printing press having thereon a moving paper substrate and having a replaceable image processing subsystem, said control system comprising:

a scanner for acquiring an image of the paper substrate; and

an image processing subsystem adapted to receive the image and process the image to determine any color register error, wherein said image processing subsystem is implemented on at least one FPGA, and wherein when it is desirable to change the image processing subsystem, said at least one FPGA is suitably re-programmed.